CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/CEMENT/2016-17 Date: 26.12.2016

TEST REPORT ON CEMENT

*** Customer**	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
*** Agency**	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
*** Name of Work**	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
*** Reference**	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
*** Sample ID**	:	Cement
Sample Received on	:	24.12.2016
Period of Testing	:	24.12.2016 to 26.12.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988 (RA-2014)	30.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	180 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	485 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988 (RA-2014)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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VIDYARANI P.K.
Technical Manager

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ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಫ್. ನಂ. ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/SAND-Gradation/2016-17 26.12.2016

TEST REPORT ON SIEVE ANALYSIS OF FINE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Fine Aggregates
Technical Reference	:	IS : 2386 (Part 1) - 1963 (RA-2011)
Sample Received On	:	24.12.2016
Date of Testing	:	26.12.2016

Total Wt. of Aggregates in gms = **1000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.40	90-100	90-100	90-100	95-100
2.36	78.40	60-95	75-100	85-100	95-100
1.18	58.40	30-70	55-90	75-100	90-100
600 Micron	28.40	15-34	35-59	60-79	80-100
300 Micron	16.90	5-20	8-30	12-40	15-50
150 Micron	7.00	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Technical Manager

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/AGG/GR/2016-17 26.12.2016

TEST REPORT ON SIEVE ANALYSIS OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Coarse Aggregates (40mm)
Technical Reference	:	IS : 2386 (Part 1) -1963 (RA-2011)
Sample Received on	:	24.12.2016
Date of Testing	:	26.12.2016

Total Wt. of Aggregates in gms= **5000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.14	95-100	85-100
20	34.64	30-70	0-20
10	13.04	10-35	0-5
4.75	2.52	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under graded specific limits.

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VIDYARANI P.K.
Technical Manager

AE-13
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#83/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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T-2377

Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/AGG/GR/2016-17 26.12.2016

TEST REPORT ON SIEVE ANALYSIS OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Coarse Aggregates (20mm) – Sample 2
Technical Reference	:	IS : 2386 (Part 1) -1963(RA-2011)
Sample Received on	:	24.12.2016
Date of Testing	:	26.12.2016

Total Wt. of Aggregates in gms= **5000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS :383-1970 (RA- 2011)	
		Graded	Single Sized
40	100	100	100
20	96.04	95-100	85-100
10	32.04	25-55	0-20
4.75	4.04	0-10	0-5

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits

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VIDYARANI P.K.
Technical Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/Steel/2016-17 26.12.2016

TEST REPORT ON REINFORCEMENT STEEL

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Samples ID	:	8mm Bar
Technical Reference	:	IS: 1786-2008
Date of Testing	:	26.12.2016

Sl No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm2	Tensile strength (Ultimate stress) N/mm2	Elongation percent gauge length		
1	8	0.39	510	512	13.05	O.K	O.K

*Information is furnished by the Customer/Representative.

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AE-13

26/12

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ಎಸ್.ಎಂ. ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/GA/W.No.13/Steel/2016-17 26.12.2016

TEST REPORT ON REINFORCEMENT STEEL

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Samples ID	:	10 mm Bar
Technical Reference	:	IS: 1786-2008
Date of Testing	:	26.12.2016

Sl No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm2	Tensile strength (Ultimate stress) N/mm2	Elongation percent gauge length		
1	10	0.62	510	512	13.1	O.K	O.K

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Civil-Tech Consultants & Engineers Bangalore

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
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Basaveshwaranagar, Bangalore-560 079.

AE-B
26/12
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T-2377

Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/Cube/2016-17 25.01.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of the work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	RCC Drain Raft Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{20}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	25.01.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	28.12.2016	25.01.2017	8.138	506.3	22.50
2	28.12.2016	25.01.2017	8.295	520.2	23.12
3	28.12.2016	25.01.2017	8.365	529.9	23.55

*Information is furnished by the Customer/Representative.

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VIDYARANI P.K.
Technical Manager

AE-13
11/25/1
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#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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T-2377

Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/Cube/2016-17 25.01.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of the work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	RCC Drain Raft Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{20}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	25.01.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	28.12.2016	25.01.2017	8.129	478.3	21.26
2	28.12.2016	25.01.2017	8.235	492.2	21.88
3	28.12.2016	25.01.2017	8.335	510.3	22.68

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AE-13

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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/Cube/2016-17 27.01.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of the work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	RCC Drain Side Wall Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{20}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	27.01.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	30.12.2016	27.01.2017	8.182	474.3	21.08
2	30.12.2016	27.01.2017	8.299	489.3	21.75
3	30.12.2016	27.01.2017	8.338	512.4	22.77

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Technical Manager

AE-13

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#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/Cube/2016-17 27.01.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of the work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	RCC Drain Side Wall Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{20}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	27.01.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	30.12.2016	27.01.2017	8.225	493.5	21.93
2	30.12.2016	27.01.2017	8.305	520.6	23.14
3	30.12.2016	27.01.2017	8.417	513.4	22.82

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/C.C.Core/2016-17 05.01.2017

TEST REPORT ON CONCRETE CORE

* Name of Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Name of Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah layout, Bangalore - 73.
* Name of work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference		AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
Techinical Reference	:	IS:516-1959 (Reaffirmed 2008), SP-24:1983.
Sample ID	:	Precast slab
Sample Received on	:	31.12.2016
Date of Testing	:	05.01.2017

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	78.00	0.384	2507.30	1.56	0.952	31.50	16.04	17.33	18.19	22.74
2	50.00	79.00	0.390	2514.25	1.58	0.955	32.50	16.55	17.88	17.07	21.33
3	50.00	80.00	0.396	2521.01	1.60	0.957	33.90	17.27	18.65	17.84	22.30

* Information is furnished by the Customer/Representative

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VIDYARANI P.K.
Technical Manager

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
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Job No.: CTCE/BBMP/GA/W.No.13/WMM/Gradation/2016-17 09.01.2017

TEST REPORT ON GRADATION OF WET MIX MACADAM

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386 (part-1)1963 (RA-2016)
Date of Testing	:	09.01.2017

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits As per Morth Table 400-11
53	0	0	0	100	100
45	135	135	2.7	97.3	95-100
22.4	1550	1685	33.70	66.30	60-80
11.2	1030	2715	54.30	45.70	40-60
4.75	550	3265	65.30	34.70	25-40
2.36	495	3760	75.20	24.80	15-30
0.600	485	4245	84.90	15.10	8-22
0.075	615	4860	97.20	2.80	0-8

*Information is furnished by the Customer/Representative.

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಪಾಲಿಕೆ
ಬಿ.ಬಿ.ಎಂ.ಪಿ, ರಮೇಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
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Job No.: CTCE/BBMP/GA/W.No.13/WMM/AIV/2016-17 09.01.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATE

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS: 2386 Part IV
Date of Testing	:	09.01.2017

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	309	310	
4	Aggregate Impact value = percent fines 100* (W2/W1)%	20.57	20.92	**20.74**

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%

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Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/GA/W.No.13/WMM/Shape.T/2016-17 09.01.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

*** Customer**	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
*** Agency**	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
*** Name of Work**	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
*** Reference**	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
*** Sample ID**	:	Wet Mix Macadam
Technical Reference	:	IS 2386(Part 1) 1963 (RA 2016)
Date of Testing	:	09.01.2017

Sl.No.	Description	Result
1	Flakiness Index	12.39%
2	Elongation Index	13.68%
3	Combined Flakiness & Elongation Index	26.07%.

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/GA/W.No.13/CSR-12/228e/QB(BC)/2016-17 12.01.2017

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Bitumen
Source/ Location	:	Hot Mix Plant, Bangalore.
Sample Received on	:	10.01.2017
Period of Testing	:	12.01.2017

The results of the tests conducted on the bitumen sample are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2014)	92	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2014)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2014)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2014)	304	Min. 220

* Information is furnished by the Customer/Representative

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VIDYARANI P.K.
Technical Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/BC/AIV/2016-17 12.01.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Hot mix plant, Bangalore.
* Type of Mix	:	Bituminous Concrete
Technical Reference	:	IS: 2386 (Part- 4)-1963 (RA-2011)
Date of Testing	:	12.01.2017

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	391	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines 100* (W2/W1) percent	22.56	22.76	**22.66**

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/GA/W.No.13/BC/Shape.T/2016-17 12.01.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	12.01.2017

Sl.No.	Description	Result
1	Flakiness Index	13.29%
2	Elongation Index	13.92%
3	Combined Flakiness & Elongation Index	27.21%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/GA/W.No.13/BC/Stripping/2016-17 13.01.2017

TEST REPORT ON STRIPPING VALUEOF ROAD AGGREGATES (STATIC IMMERSION TEST)

*** Customer**	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
*** Agency**	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
*** Name of Work**	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
*** Reference**	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
Technical Reference	:	IS: 6241
*** Type of Mix**	:	Bituminous Concrete
Date of Testing	:	13.01.2017

Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

*Information is furnished by the Customer/Representative.

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/GA/W.No.13/BC/Sp_Wa/2016-17 13.01.2017

TEST REEPORT ON SPECIFIC GRAVITY AND WATER ABSORPTION

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -3)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	13.01.2017

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1999	2000	2001	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1246	
4	Weight of saturated surface dry aggregate in air	W_3 g	2025	2026	2024	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	786	788	778	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.556	2.551	2.585	2.564
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.609	2.604	2.629	2.614
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.80%	0.65%	0.75%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore 79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No: CTCE/BBMP/GA/W.No.13/BC/Bitumen/2016-17 13.01.2017

TEST REPORT ON BITUMEN CONTENT OF BITUMINOUS CONCRETE MIX

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Roads around Ayimatha Ward No.13, BBMP, Bangalore.
Technical Reference	:	IRC:SP:11-1984
Date of Testing	:	13.01.2017

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	27.00
7. Bitumen content in %	5.20	5.40
8. Average	**5.30**	

*Information is furnished by the Customer/Representative.

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Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No: CTCE/BBMP/GA/W.No.13/BC/Bitumen/2016-17 13.01.2017

TEST REPORT ON BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Roads around Ayimatha Ward No.13, BBMP, Bangalore.
Technical Reference	:	IS 2386 and IRC:SP:11-1984
Date of Testing	:	13.01.2017

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	44.38	9.36	9.36	90.64	79-100
9.5	36.35	7.67	17.03	82.97	70-88
4.75	70.28	14.83	31.86	68.14	53-71
2.36	69.22	14.60	46.46	53.54	42-58
1.18	50.28	10.61	57.07	42.93	34-48
0.6	52.38	11.05	68.12	31.88	26-38
0.3	45.38	9.57	77.69	22.31	18-28
0.15	40.22	8.49	86.18	13.82	12-20
0.075	36.33	7.66	93.84	6.16	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	34.18	7.23	7.23	92.77	79-100
9.5	42.36	8.96	16.18	83.82	70-88
4.75	69.36	14.66	30.85	69.15	53-71
2.36	70.25	14.85	45.70	54.30	42-58
1.18	63.15	13.35	59.05	40.95	34-48
0.6	53.13	11.23	70.28	29.72	26-38
0.3	32.26	6.82	77.10	22.90	18-28
0.15	29.22	6.18	83.28	16.72	12-20
0.075	42.36	8.96	92.23	7.77	4-10

*Information is furnished by the Customer/Representative.

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#23/14, 7th Cross. 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/BC/Agg/2016-17 13.01.2017

TEST REPORT ON GRADATION OF AGGREGATE

* Customer	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
* Name of Work	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
* Reference	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
* Sample ID	:	Bituminous Concrete
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Hot mix plant, Bangalore
Date of Testing	:	13.01.2017

Total Weight of Sample: **5150** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per `MORTH 500-18
13.2	785	15.24	15.24	84.76	79 - 100	
9.5	530	10.29	25.53	74.47	70 - 88	
4.75	625	12.14	37.67	62.33	53 - 71	
2.36	540	10.49	48.16	51.84	42 - 58	
1.18	525	10.19	58.35	41.65	34 - 48	
0.600	545	10.58	68.93	31.07	26 - 38	
0.300	595	11.55	80.49	19.51	18 - 28	
0.150	325	6.31	86.80	13.20	12 - 20	
0.075	350	6.80	93.59	6.41	4 - 10	

Total Weight of Sample: **5300** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH 500-18
13.2	615	11.60	11.60	88.40	79 - 100	
9.5	520	9.81	21.42	78.58	70 - 88	
4.75	635	11.98	33.40	66.60	53 - 71	
2.36	575	10.85	44.25	55.75	42 - 58	
1.18	630	11.89	56.13	43.87	34 - 48	
0.600	520	9.81	65.94	34.06	26 - 38	
0.300	565	10.66	76.60	23.40	18 - 28	
0.150	390	7.36	83.96	16.04	12 - 20	
0.075	485	9.15	93.11	6.89	4 - 10	

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Civil-tech Consultants & Engineers
#23/14, 7th Cross, 3rd Stage, 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/GA/W.No.13/BC/Stability/2016-17 13.01.2017

TEST REPORT ON MARSHALL STABILITY OF MIX

*** Customer**	:	**Asst. Executive Engineer,** Shettyhallii Sub Division, BBMP, Bangalore.
*** Agency**	:	**Mr. G. Ashwathappa,** #470, 11th Cross, Ramaiah Layout, Bangalore - 73.
***Name of the Work**	:	Improvements & Asphalting to Main & Cross roads at Ayimatha temple road in Ward No.13, in Shettyhalli Sub Division, BBMP, Bangalore.
***Reference**	:	AEE/SSD/PR/98/2016-17 Dated: 24.12.2016
*** Source**	:	Hot mix Plant, Bangalore
*** Type of Mix**	:	Bituminous Concrete
Date of Testing	:	13.01.2017

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshall Stability, Kn	9.50	9.80	9 Kn (min)
2	Marshall flow, mm	2.90	3.10	2 – 4
3	Percent air voids in Mineral Aggregate	3.30	3.55	3 – 6
4	Voids in Compacted Mix	13.40	13.90	13 - 15
5	Percent Voids filled with Bitumen	66.60	67.50	65 - 75
6	Density, g/cc	2.26	2.27	--

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಂ. ರಸ್ತೆ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು

Civil-tech Consultants & Engineers
#23/14, 7th Cross. 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com